NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA

SURATHKAL, MANGALORE - 575 025

Course Code – CS111

Course Name – Computer Programming Lab

Lab - 06

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Structures and Union

Question – 1

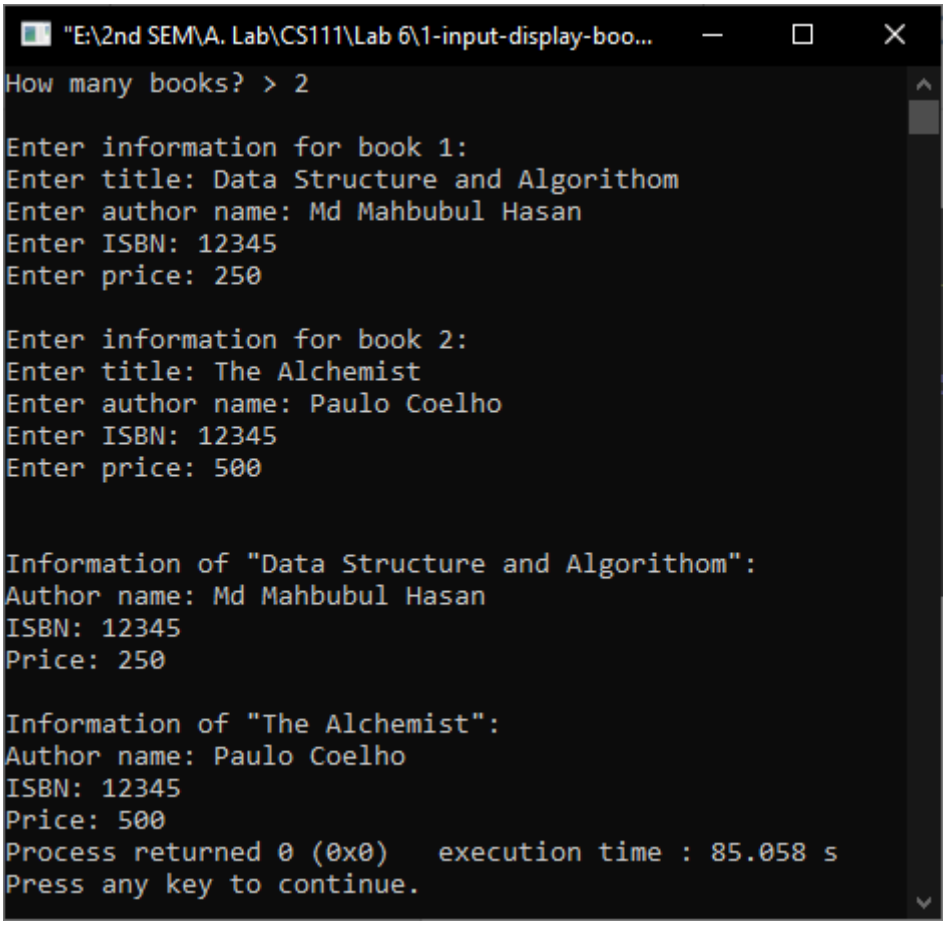
Program to input and display book information (Title of the book, Author, ISBN, Price)

Answer

```c
#include<stdio.h>
#define MAX_SIZE 100

typedef struct {
    char book_title[MAX_SIZE];
    char author[MAX_SIZE];
    int isbn;
    int price;
} book_info;

int main()
{
    int n, i;
    printf("How many books? > ");
    scanf("%d", &n);
    book_info book[n];
    for(i=0; i<n; i++)      //taking input
    {
        printf("\nEnter information for book %d: \n", i+1);
        printf("Enter title: ");
        scanf(" %[^\n]%*c", book[i].book_title);
        printf("Enter author name: ");
        scanf(" %[^\n]%*c", book[i].author);
        printf("Enter ISBN: ");
        scanf("%d", &book[i].isbn);
        printf("Enter price: ");
        scanf("%d", &book[i].price);
    }
    for(i=0; i<n; i++)      // printing information
```

```
    {
        printf("\n\nInformation of \"%s\":\n", book[i].book_title);
        printf("Author name: %s\n", book[i].author);
        printf("ISBN: %d\n", book[i].isbn);
        printf("Price: %d", book[i].price);
    }
    return 0;
}
```

Output



Question 2

Program to accept 5 people's name, address, telephone number and to search for the information of a particular person-

1. Based on name
2. Based on telephone number

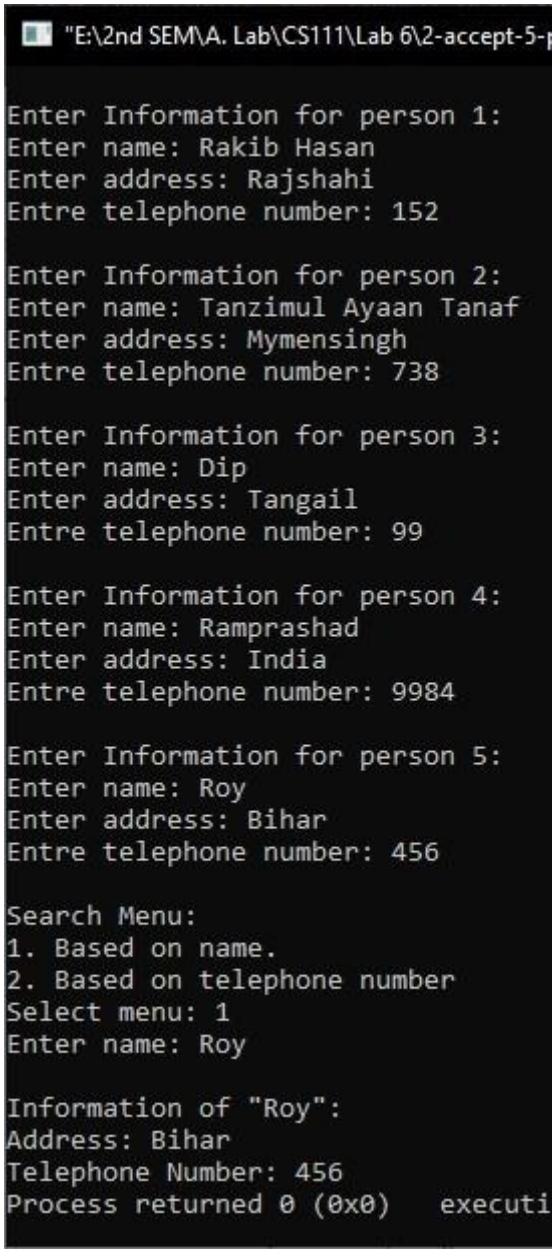
Answer

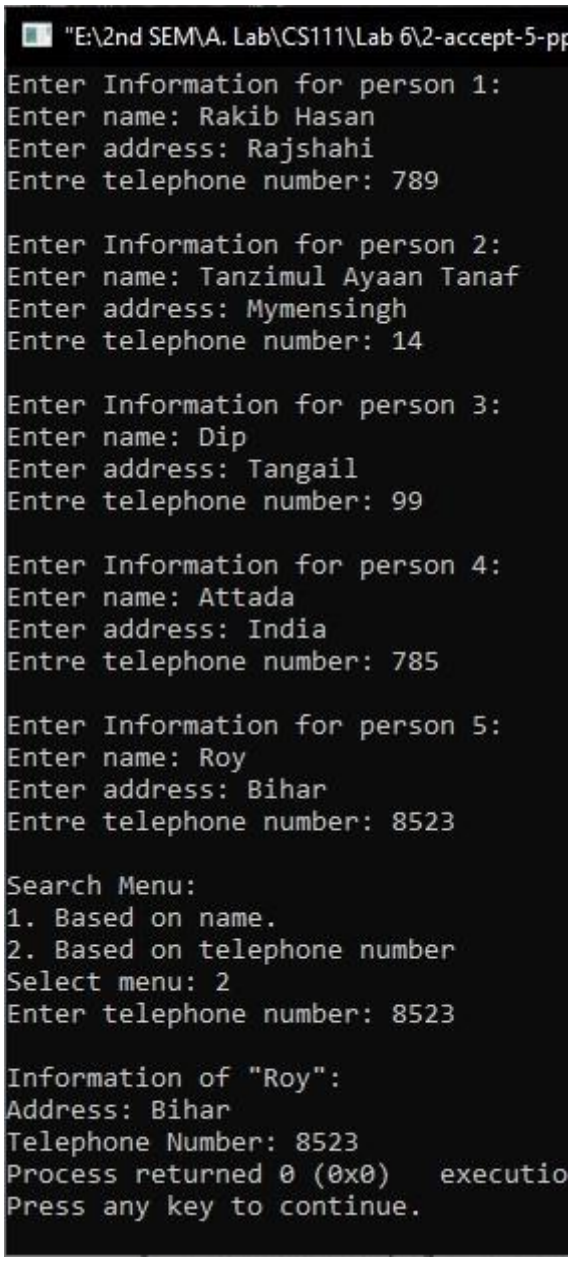
```c
#include <stdio.h>
#include <string.h>
#define MAX_SIZE 100
typedef struct //structure
{
    char name[MAX_SIZE];
    char address[MAX_SIZE];
    int tel_num;
} person_info;

//functions
void search(char name[], person_info person[]);
void search_tel(int n, person_info person[]);
void show_info(int n, person_info person[]);

int main()
{
    person_info person[5];
    int i, n, tel;
    char name[MAX_SIZE];
    for (i = 0; i < 5; i++)
    {
        printf("\nEnter Information for person %d:\n", i + 1);
        printf("Enter name: ");
        scanf(" %[^\n]%*c", &person[i].name);
        printf("Enter address: ");
        scanf(" %[^\n]%*c", &person[i].address);
        printf("Entre telephone number: ");
```

```
        scanf("%d", &person[i].tel_num);
    }
    printf("\nSearch Menu: \n");
    printf("1. Based on name.\n");
    printf("2. Based on telephone number\n");
    printf("Select menu: ");
    scanf("%d", &n);
    switch (n)
    {
    case 1:
        printf("Enter name: ");
        scanf(" %[^\n]%*c", name);
        search(name, person);
        break;
    case 2:
        printf("Enter telephone number: ");
        scanf("%d", &tel);
        search_tel(tel, person);
        break;
    default:
        printf("Wrong Input. Program closed");
        break;
    }
    return 0;
}

//search by name
void search(char name[], person_info person[])
{
    int i;
    for (i = 0; i < 5; i++)
    {
        if (strcmp(name, person[i].name) == 0)
        {
```

```
            break;
        }
    }
    show_info(i, person);
}

//search by telephone number
void search_tel(int n, person_info person[])
{
    int i;
    for (i = 0; i < 5; i++)
    {
        if (n == person[i].tel_num)
        {
            break;
        }
    }
    show_info(i, person);
}

//show result
void show_info(int i, person_info person[])
{
    if (i >= 5)
    {
        printf("\nNOT FOUND");
    }
    else
    {
        printf("\nInformation of \"%s\": \n", person[i].name);
        printf("Address: %s\n", person[i].address);
        printf("Telephone Number: %d", person[i].tel_num);
    }
}
```

Output


"E:\2nd SEM\A. Lab\CS111\Lab 6\2-accept-5-
Enter Information for person 1:
Enter name: Rakib Hasan
Enter address: Rajshahi
Entre telephone number: 152
Enter Information for person 2:
Enter name: Tanzimul Ayaan Tanaf
Enter address: Mymensingh
Entre telephone number: 738
Enter Information for person 3:
Enter name: Dip
Enter address: Tangail
Entre telephone number: 99
Enter Information for person 4:
Enter name: Ramprashad
Enter address: India
Entre telephone number: 9984
Enter Information for person 5:
Enter name: Roy
Enter address: Bihar
Entre telephone number: 456
Search Menu:
1. Based on name.
2. Based on telephone number
Select menu: 1
Enter name: Roy
Information of "Roy":
Address: Bihar
Telephone Number: 456
Process returned 0 (0x0) executi


"E:\2nd SEM\A. Lab\CS111\Lab 6\2-accept-5-pp
Enter Information for person 1:
Enter name: Rakib Hasan
Enter address: Rajshahi
Entre telephone number: 789
Enter Information for person 2:
Enter name: Tanzimul Ayaan Tanaf
Enter address: Mymensingh
Entre telephone number: 14
Enter Information for person 3:
Enter name: Dip
Enter address: Tangail
Entre telephone number: 99
Enter Information for person 4:
Enter name: Attada
Enter address: India
Entre telephone number: 785
Enter Information for person 5:
Enter name: Roy
Enter address: Bihar
Entre telephone number: 8523
Search Menu:
1. Based on name.
2. Based on telephone number
Select menu: 2
Enter telephone number: 8523
Information of "Roy":
Address: Bihar
Telephone Number: 8523
Process returned 0 (0x0) executio
Press any key to continue.

Question – 4

Store the item number, item name, unit price and quantity in stock of N items in a supermarket. Display the following list of items present in the stock.

1. List of items with unit price greater than Rs 129
2. List of items with quantity in stock less than 5

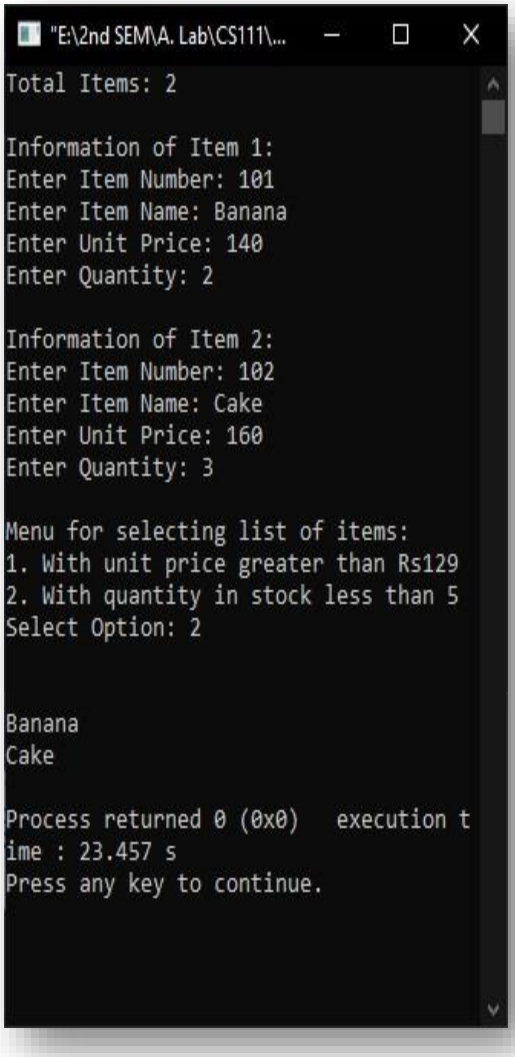
Answer

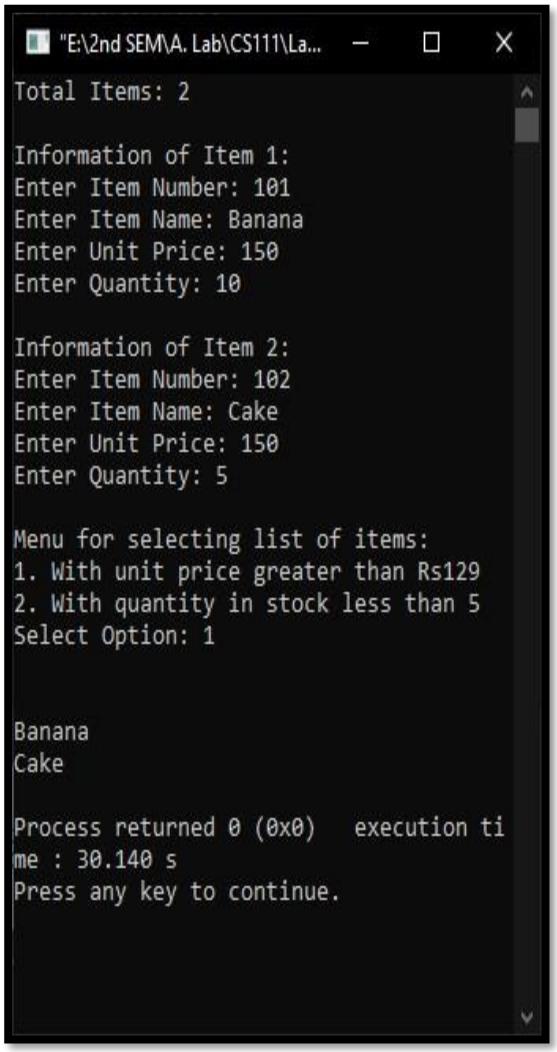
```c
#include <stdio.h>
#define MAX_SIZE 100

typedef struct
{
    int item_num;
    char item_name[MAX_SIZE];
    int unit_price;
    int quantity;
} items;

//functions
void list_by_unit_price(int n, items item[]);
void list_by_quantity(int n, items item[]);

int main()
{
    int n, i, option;
    printf("Total Items: ");
    scanf("%d", &n);
    items item[n];
    for (i = 0; i < n; i++)
    {
        printf("\nInformation of Item %d: \n", i + 1);
        printf("Enter Item Number: ");
        scanf("%d", &item[i].item_num);
        printf("Enter Item Name: ");
        scanf(" %[^\n]%*c", item[i].item_name);
```

```
        printf("Enter Unit Price: ");
        scanf("%d", &item[i].unit_price);
        printf("Enter Quantity: ");
        scanf("%d", &item[i].quantity);
    }
    printf("\nMenu for selecting list of items: \n");   //selecting
menu
    printf("1. With unit price greater than Rs129\n");
    printf("2. With quantity in stock less than 5\n");
    printf("Select Option: ");
    scanf("%d", &option);
    printf("\n\n");
    switch (option)
    {
    case 1:
        list_by_unit_price(n, item);
        break;
    case 2:
        list_by_quantity(n, item);
        break;
    default:
        printf("Wrong Input. Program Closed");
        break;
    }
    return 0;
}

//function for getting list item with unit price > Rs 129
void list_by_unit_price(int n, items item[])
{
    int i;
    for (i = 0; i < n; i++)
    {
        if (item[i].unit_price > 129)
```

```
        {
            printf("%s\n", item[i].item_name);
        }
    }
}

//function for getting list item with quantity < 5
void list_by_quantity(int n, items item[])
{
    int i;
    for (i = 0; i < n; i++)
    {
        if (item[i].quantity < 5)
        {
            printf("%s\n", item[i].item_name);
        }
    }
}
```

Output


"E:\2nd SEM\A. Lab\CS111\...
Total Items: 2
Information of Item 1:
Enter Item Number: 101
Enter Item Name: Banana
Enter Unit Price: 140
Enter Quantity: 2
Information of Item 2:
Enter Item Number: 102
Enter Item Name: Cake
Enter Unit Price: 160
Enter Quantity: 3
Menu for selecting list of items:
1. With unit price greater than Rs129
2. With quantity in stock less than 5
Select Option: 2
Banana
Cake
Process returned 0 (0x0) execution t
ime : 23.457 s
Press any key to continue.


"E:\2nd SEM\A. Lab\CS111\La...
Total Items: 2
Information of Item 1:
Enter Item Number: 101
Enter Item Name: Banana
Enter Unit Price: 150
Enter Quantity: 10
Information of Item 2:
Enter Item Number: 102
Enter Item Name: Cake
Enter Unit Price: 150
Enter Quantity: 5
Menu for selecting list of items:
1. With unit price greater than Rs129
2. With quantity in stock less than 5
Select Option: 1
Banana
Cake
Process returned 0 (0x0) execution ti
me : 30.140 s
Press any key to continue.

Question – 5

Write a menu driven program for the following

1. Add two distances (in inch-feet) using structure
2. Add two complex numbers by passing structure to a function
3. Calculate the difference between two time periods using structure

Answer

```c
#include <stdio.h>

// structures
typedef struct
{
    double inch;
    double feet;
} distance;

typedef struct
{
    double real;
    double imaginary;
} complex;

typedef struct
{
    int sec;
    int min;
    int hour;
} time;

// functions
void add_two_distance();
void add_two_complex_number();
void add_com(complex com[]);
void difference_between_two_time();
int time_dif(time time[]);
```

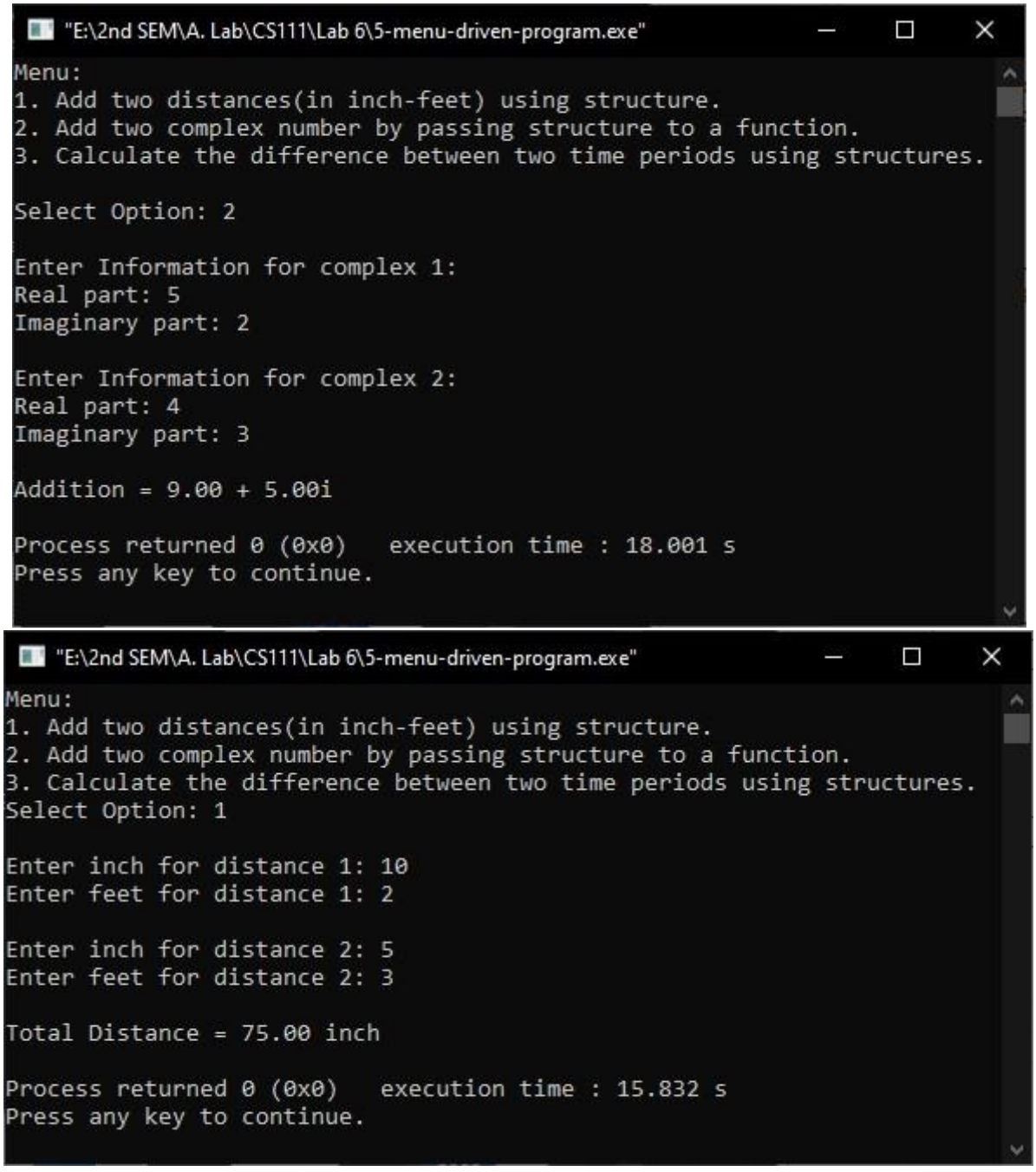
```c
int main()
{
    int n;
    printf("Menu: \n");
    printf("1. Add two distances(in inch-feet) using structure.\n");
    printf("2. Add two complex number by passing structure to a func
tion.\n");
    printf("3. Calculate the difference between two time periods usi
ng structures.\n");
    printf("Select Option: ");
    scanf("%d", &n);
    switch (n)
    {
    case 1:
        add_two_distance();
        break;
    case 2:
        add_two_complex_number();
        break;
    case 3:
        difference_between_two_time();
        break;
    default:
        printf("Wrong Input, Program closed");
    }
    return 0;
}

//function to calculate distance
void add_two_distance()
{
    int i;
    double result = 0;
```

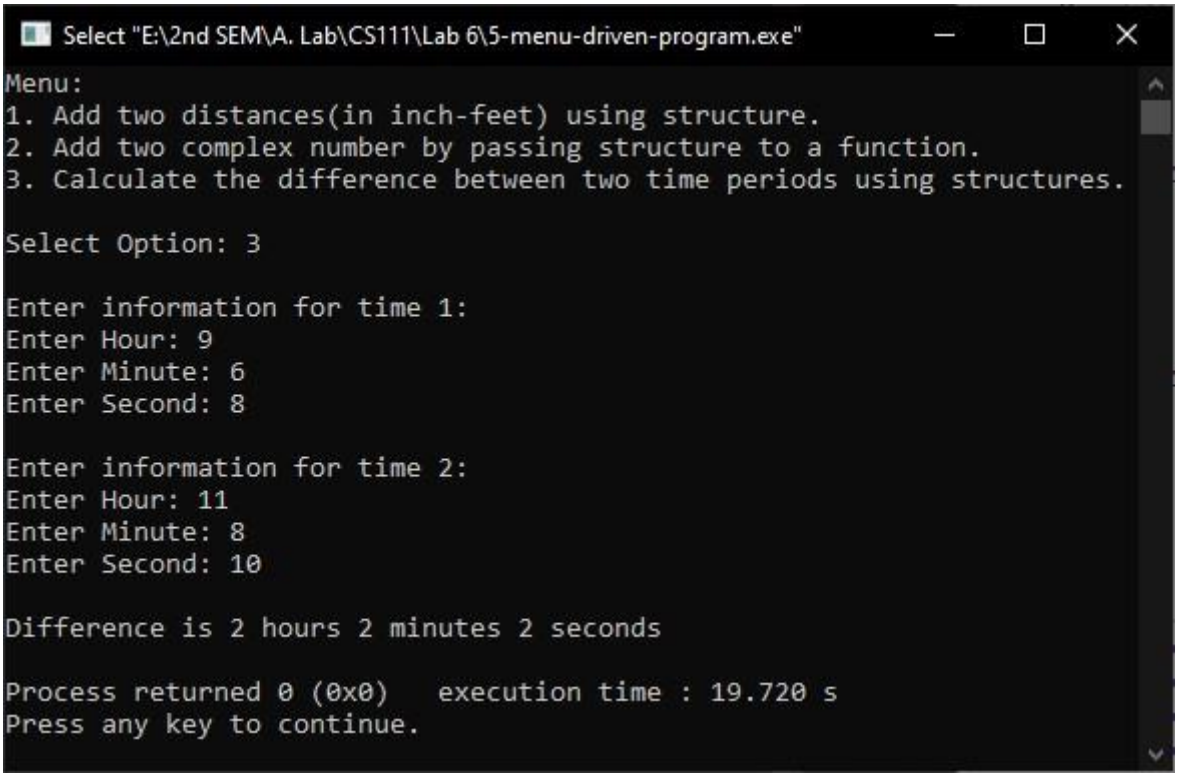
```
    distance dist[2];
    for (i = 0; i < 2; i++)
    {
        printf("\nEnter inch for distance %d: ", i + 1);
        scanf("%lf", &dist[i].inch);
        printf("Enter feet for distance %d: ", i + 1);
        scanf("%lf", &dist[i].feet);
    }
    for (i = 0; i < 2; i++)
    {
        result += (dist[i].inch + (dist[i].feet * 12));
    }
    printf("\nTotal Distance = %.2lf inch\n", result);
}

//function for addition of complex number
void add_two_complex_number()
{
    int i;
    complex com[2];
    for (i = 0; i < 2; i++)
    {
        printf("\nEnter Information for complex %d:\n", i + 1);
        printf("Real part: ");
        scanf("%lf", &com[i].real);
        printf("Imaginary part: ");
        scanf("%lf", &com[i].imaginary);
    }
    add_com(com);
}

//complex addition
void add_com(complex com[])
{
```

```
    int i;
    double real = 0, ima = 0;
    for (i = 0; i < 2; i++)
    {
        real += com[i].real;
        ima += com[i].imaginary;
    }
    printf("\nAddition = %.2lf + %.2lfi\n", real, ima);
}
//difference between two time
void difference_between_two_time()
{
    int i, sec_dif, h, m, s;
    time t[2];
    for (i = 0; i < 2; i++)
    {
        printf("\nEnter information for time %d:\n", i + 1);
        printf("Enter Hour: ");
        scanf("%d", &t[i].hour);
        printf("Enter Minute: ");
        scanf("%d", &t[i].min);
        printf("Enter Second: ");
        scanf("%d", &t[i].sec);
    }
    sec_dif = time_dif(t);
    h = sec_dif / 3600;
    m = (sec_dif % 3600) / 60;
    s = (sec_dif % 3600) % 60;
    printf("\nDifference is %d hours %d minutes %d seconds\n", h, m,
 s);

//time difference calculation
int time_dif(time time[])
{
```

```
    int t1, t2, dif;
    t1 = (time[0].hour * 3600) + (time[0].min * 60) + time[0].sec;
    t2 = (time[1].hour * 3600) + (time[1].min * 60) + time[1].sec;
    dif = t1 >= t2 ? (t1 - t2) : (t2 - t1);
    return dif;
}
```

Output




Select "E:\2nd SEM\A. Lab\CS111\Lab 6\5-menu-driven-program.exe"
Menu:
1. Add two distances(in inch-feet) using structure.
2. Add two complex number by passing structure to a function.
3. Calculate the difference between two time periods using structures.
Select Option: 3
Enter information for time 1:
Enter Hour: 9
Enter Minute: 6
Enter Second: 8
Enter information for time 2:
Enter Hour: 11
Enter Minute: 8
Enter Second: 10
Difference is 2 hours 2 minutes 2 seconds
Process returned 0 (0x0) execution time : 19.720 s
Press any key to continue.